CONTENTS

Foreword vii

GRAIN BOUNDARIES AND OTHER INTERFACES

Grain boundary structure and migration
D.A. Smith 1

Effect of thermal and stress exposure on grain boundaries of silicon nitride
S.A. Bradley and K.R. Karasek 9

The determination of the structure and composition at interfaces to atomic resolution
C.B. Boothroyd, C.S. Baxter, E.G. Bithell, M.J. Hÿtch, F.M. Ross, K. Sato and W.M. Stobbs 18

Frontiers of analytical electron microscopy with special reference to cluster and interface problems
C. Colliex, J.L. Maurice and D. Ugarte 31

Extraction of electronic structural information on the grain-boundaries of Pd-based polycrystalline specimens with transmission electron energy loss spectroscopy
D.R. Liu 50

Microstructural studies of sputter-deposited TiN ceramic films
A.R. Pelton, B.W. Dabrowski, L.P. Lehman, C. Ernsberger, A.E. Miller and J.F. Mansfield 60

High resolution transmission electron microscopy of interphase interfaces in $NiO–ZrO_2(CaO)$
V.P. Dravid, C.E. Lyman, M.R. Notis and A. Revcolevschi 71

Chemical compatibility of CVD and plasma-assisted CVD Si_3N_4 and SiO_2 coatings for thermal protection of carbon–carbon composite
W. Kowbel, P.S. Chen and H. Yenchang 80

Diffraction studies of structure in two Fe multilayers
C.L. Foiles 88

Material transport mechanisms during the diffusion bonding of niobium to Al_2O_3
K. Burger and M. Rühle 98

Interfacial studies of carbon–carbon composites
W. Kowbel, P.S. Chen and H. Yenchang 110

On the preparation of cross-sectional TEM samples using lithographic processing and reactive ion-etching
J.T. Wetzel, M. Jost, S.A. Rishton, P.M. Fryer, K.T. Kwietniak, D. Klaus, J.J. Bucchignano, C.-K. Hu and T.J. Brown, Jr. 115

Electron microscopy of $Bi_2Sr_2Ca_nCu_{1+n}O_{6+2n}$ and $Tl_2Ba_2Ca_nCu_{1+n}O_{6+2n}$ superconductors
G. Van Tendeloo, H.W. Zandbergen, J. Van Landuyt and S. Amelinckx

SURFACE, REFLECTION ELECTRON MICROSCOPY AND REFLECTION HIGH ENERGY DIFFRACTION

Profile imaging of surfaces and surface reactions
D.J. Smith, R.W. Glaisher, P. Lu and M.R. McCartney 123
Reflection electron imaging of free surfaces and surface/dislocation interactions
L.-M. Peng, J.M. Cowley and T. Hsu 135
Secondary electron spectroscopy in a dedicated scanning transmission electron microscope
A.L. Bleloch 147
Characterization of freeze-dried alumina powders using electron microscopy
I.K. Lloyd, J.R. Blachere, L.A. Beyer, C.E. Kalnas and P.A. Mairet 153
Surface electromigration of metal atoms on Si(111) surfaces studied by UHV reflection electron microscopy
A. Yamanaka, K. Yagi and H. Yasunaga 161
Thermal diffuse scattering and REM image-contrast preservation
L.-M. Peng and J.M. Cowley 168
Elastic and inelastic scattering effects in reflection electron microscopy
A.L. Bleloch, A. Howie, R.H. Milne and M.G. Walls 175
Dynamical theory of spot splitting in RHEED
L.D. Marks and Y. Ma 183
RHEED detection of near surface crystalline phases on a $Pd_{80}Si_{20}$ metallic glass surface with adsorbates present
P. Tlomak, I. Hannus and W.E. Brower, Jr. 192

IN SITU AND RELATED STUDIES

Application of transmission electron microscopy to the observation of dislocation emission from crack tips at elevated temperatures
D.R. Clarke and Y.-H. Chiao 203
Anomalous slip in an FCC system
T.C. Lee, I.M. Robertson and H.K. Birnbaum 212
Electron irradiation damage in oxides
M.I. Buckett, J. Strane, D.E. Luzzi, J.P. Zhang, B.W. Wessels and L.D. Marks 217
Decomposition of refractory carbides in the analytical electron microscope
D.L. Medlin, L.E. Thomas and D.G. Howitt 228
TEM and in-situ EM study of the dispersion of MoO_3 on SiO_2
A. Datta, J.R. Regalbuto and C.W. Allen 233
In-situ HVEM studies of the early stages of oxidation of nickel and nickel–chromium alloys
P. Marikar, M.B. Brodsky, C.H. Sowers and N.J. Zaluzec 247
In-situ observations of intrinsic grain boundary structure during thermal cycling
T. Lillo, M.R. Plichta and S.A. Hackney 257

ELEMENTAL MICROANALYSIS

Characterization of ceramic films and interfaces by electron microscopic and spectroscopic techniques
A. Erdemir and C.C. Cheng 266

Analysis of precipitation in cast alloy 718
G. Muralidharan, R.G. Thompson and S.D. Walck 277
Radiation damage and copper distribution in 14 MeV copper-ion-implanted nickel – TEM and AEM analyses in cross-section
L.M. Wang, R.A. Dodd and G.L. Kulcinski 284
Cross-section specimen preparation technique for nickel alloys and stainless steels
L.E. Seitzman, L.M. Wang, R.D. Griffin, A.P. Komissarov, G.L. Kulcinski and R.A. Dodd 291

Author index 299
Subject index 302